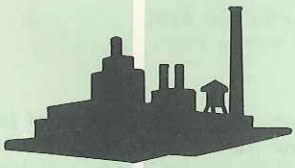
HOW TO SELECT AND INSTALL

electric

MOTORS



for

- Home
- Farm
- Business
- Industry

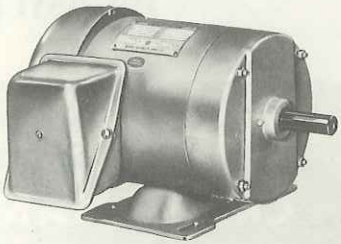
There is a CRAFTSMAN MOTOR for every need

A CRAFTSMAN
REG. TRADE MARK
HANDBOOK

A Motor Is Better Than Muscles .....

Yesterday, every household, farm and production task had to be done the hard way — by physical labor. Jobs like heating and refrigeration, sharpening tools, carpet sweeping, loading a silo — even the simple necessity of drawing water — all required muscles . . . and lots of your own energy, to get them done.

Today, silent, efficient dependable electric motors do all these chores — and hundreds more. Motors are used for just about every kind of work: Garbage disposal, dishwashing, polishing — and heavy-duty labor and production jobs too numerous to mention. Count the electric motors serving you. You'll be surprised at the number.



SEARS Your Selection Of

• **BECAUSE** Sears Motor Line for the Workshop, Home, Farm—for tools, appliances and machines — is complete . . . *a better motor at the best price for each and every job.*

Over 90% of the homes, offices, farms and small businesses (excluding only "heavy" and specialized industries) in the U.S. are furnished electrical power that requires the use of one or another of the kinds of motors in Sears Motor Line. Also, the great majority of jobs to be done in all these places need motors of the exact types and sizes available at Sears. For convenience, we divide these into four groups, as shown at the bottom of this page. Un-

WHY DIFFERENT KINDS OF MOTORS (Pages 4-5)

FEATURES OF SPLIT-PHASE & CAPACITOR TYPE MOTORS (Pages 6-7)

GENERAL PURPOSE AND POWER TOOL MOTORS (Pages 8-9)

HY-DUTY FARM & INDUSTRIAL MOTORS (Pages 10-11)

SPECIAL APPLICATION MOTORS (Pages 12-13)

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Printed In U.S.A.

With The RIGHT CRAFTSMAN MOTOR

As wonderfully designed and miracle-working as most motors are, there are limits to the size of load that each can carry — to the neglect and abuse that each can suffer without damage. You don't expect too much of your muscles. It's just as unreasonable to ask more of a motor than it is designed to give.

Before putting your new motor to work, do it — *and yourself* — the favor of learning something about it. Read this booklet. It tells you how to judge whether or not you have the right motor for your job. It also tells you how to install and maintain your motor so that it will serve you faithfully and tirelessly.

MAKES THE Motor Easy

• **BECAUSE** Sears Information and the Identification Data with each motor make it a quick and simple matter for you to select the *exact right motor* for your job.

less your job requires a "tailor-built" motor the chances are better than 9 to 1 that you will find the *right* motor in one of these four Sears classifications.

Because there are four different groups, with many sizes in each group, your task of finding the right motor might still be difficult, except for the help Sears gives you. *Sears Selection and Identification Data* make your selection easy. This booklet will also help.

IF SPECIAL SELECTION BECOMES NECESSARY (Pages 14-15)

HOW TO INSTALL — ELECTRICAL REQUIREMENTS (Pages 16-19)

HOW TO INSTALL — PHYSICAL REQUIREMENTS (Pages 20-21)

MOTOR ACCESSORIES (Pages 22-24)

SPECIFIC MOTOR APPLICATIONS (Pages 25-31)

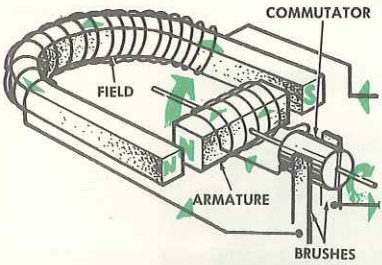
WHY THERE ARE DIFFER

Commercial electricity is manufactured by Power Company *generators* and transported by wires in the form of *current.* There are different kinds. *DC (direct current)* electricity "flows" (like water in a pipe) always in one direction; *AC (alternating current)* electricity "flows" out then back in equal amounts. Both currents travel at 186,000 miles per sec. — but AC can be made to change its direction with different rapidity *(frequency).* If it changes 120 times per sec. (so that it makes 60 round trips — out, and back to generator — per sec.) we call it *60-cycle* AC. Also used are 25- and 50-cycle.

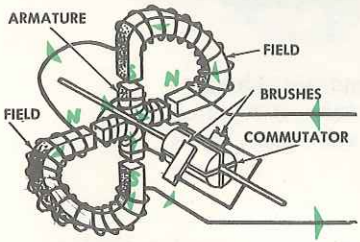
In addition to different frequencies AC is also supplied in different phases. *Single-phase AC* is one current occupying the wires by itself. *Polyphase AC* is two or more separate currents (from two or more generators) flowing together in the same wires but with the periods of cycling staggered. For instance, *3-phase AC* consists of three currents changing their directions at 1/3 intervals.

Every current requires a *circuit*, an unbroken "path" from the generator to the device using the electricity, and back to the generator. This circuit is formed by *conductors* (usually wires) enclosed by non-conductors. The amount of current "flowing" in a conductor at any instant is

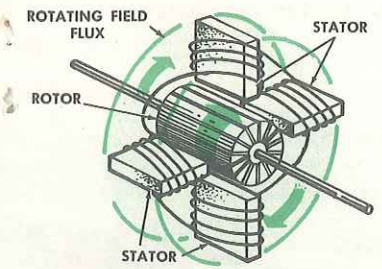
EACH TYPE OF MOTOR IS



SERIES-WOUND DC TYPE



AC REPULSION TYPE



AC INDUCTION TYPE (Already Running)

DIRECT-CURRENT MOTORS

The earliest kind, DC motors are still used for some purposes, and where only DC power is available.

In a simple, *Series Wound DC* motor, current "flows" through the wires of a *field* (stationary part) then through wires on an *armature* (rotating part). It is conducted to the armature by *brushes* which rub a *commutator* on the shaft. In "flowing" it makes the field and armature into magnets having *north* (N) *poles and south* (S) *poles* with like poles adjacent. But *like poles* repel each other — so the armature rotates 180° to place the *unlike poles* (which attract each other) adjacent. However, each time the armature rotates 180° the commutator reverses current flow through the armature so that adjacent poles are again alike. Hence the armature continutes to rotate.

The above motor will vary in speed with variations in the voltage and the load placed on it, but is powerful at starting. There are also *Shunt-Wound* and *Compound-Wound* DC motors.

SINGLE-PHASE AC MOTORS

AC motors are of 4 basic types, but for practical purposes we will consider only the *Repulsion and Induction types.* The other 2 are: *Series-Wound* (see Universal Motors), and *Synchronous* (used mostly for clocks).

REPULSION MOTOR

This is like the Series-Wound DC motor — except that the brushes are connected together, instead of in series with the field. When the field is excited (current turned on), a current (and resulting N and S poles) is created in the armature by an electrical process called *induction.* Therefore, the motor will run without the supply current flowing through the armature. It has a powerful starting ability, due to the brushes — but (also due to the brushes) has the disadvantage of slowing down in proportion to its load, the same as a Series-Wound DC motor. Consequently, it is limited in use — and Sears does not carry this type.

INDUCTION MOTOR

When the Repulsion motor (above) is running, a *flux* (magnetic field) is created by the field magnets which will induce the needed polarity (existence of N and S poles) in the rotating part, without the aid of brushes and a commutator. These parts can be omitted, and we have an Induction motor — and the armature is now called a *rotor* and the field is called a *stator.* Some rotors

ENT KINDS OF MOTORS

measured in *amperes (A or amps)* like water is measured in gallons. The force that "pushes" the current is measured in *volts (V)* like water pressure is measured in lbs/sq-in. When a current of 1A is pushed by a force of 1V (1Ax1V) an amount of work designated as *1 Watt (W)* will be done. Power companies sell electricity by the *Kilowatt Hour* — a unit equivalent to 1,000 watts of work in an hour.

Power companies supply current at certain standardized voltages. However, the wires offer a *resistance* to current flow which diminishes the original volts in proportion to distance. Despite the use of devices to keep voltage constant in the power lines, there usually is a *voltage drop* at the point where a current is put to work. Hence, the standard furnished voltages are correctly stated as 115V (approx.), 230V (approx.), and 440V (approx.).

Generally, a *2-wire* service (into a building) indicates 115V, 60-cycles, single-phase AC; *3 wires* can be 230V ditto (especially in a city) which can be split to make two 115V circuits . . . or it can be 3-phase, 60-cycle AC at 230V or 440V (especially in rural areas). There are, of course, exceptions. Over 90% of the service to U.S. homes, offices, farms and small businesses is *single-phase, 60-cycle AC, either at 115V or 230V.*

DESIGNED FOR A PURPOSE

are wire wound; some *(squirrel-cage type)* simply have a series of copper bars embedded in a soft iron core, or are diecast aluminum.

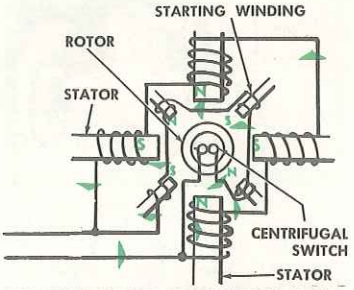
The induction motor has big advantages over other types: It will run practically without loss of speed due to current or load variations, up to the limit of capacity; and is very efficient. But it is not self-starting, so various *starting devices* are used:

A *SPLIT-PHASE* motor is an induction motor with a *starting winding* added to the stator, and arranged to be cut out by a centrifugal switch after the motor is started. For easy-to-start loads where high starting current is *not* a problem.

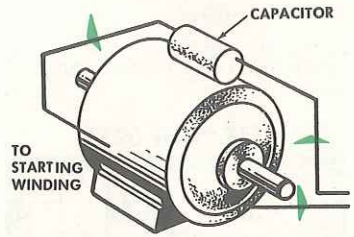
A *CAPACITOR* motor is a Split-Phase motor with a *condenser* added to reduce the starting current required and increase the starting *torque* (power). For hard-to-start applications requiring *low* starting current.

A *SHADED-POLE* motor is a variation of the Split-Phase motor, without means of cutting out the starting device. It has less starting power and is less efficient in operation.

A *REPULSION-INDUCTION* motor is a Repulsion motor with a centrifugal switch to cut out the brushes after starting. In some types the brushes are also lifted off the commutator. This motor has all the best features of both types, starting as a Repulsion motor but running as an Induction motor.



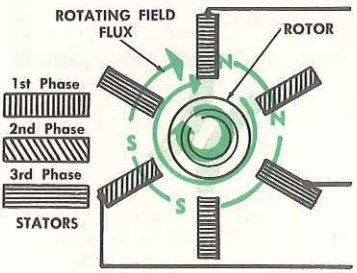
AC SPLIT-PHASE INDUCTION TYPE



CAPACITOR-START INDUCTION TYPE

POLYPHASE (3-PHASE) AC MOTORS

A *3-PHASE* motor is "strictly" an Induction type. It uses 3-phase current (top of page) and is like three separate, single-phase induction motors consolidated into one — with the added advantage that each exerts its "peak pull" during 1/3 of a cycle, while the other two are not at their "peak pull" positions. It has a very powerful start, and a great overload capacity.



3-PHASE INDUCTION TYPE

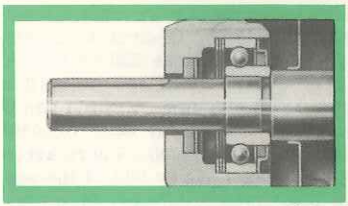
UNIVERSAL MOTORS

These are really Series-Wound AC motors designed to perform well on both single-phase AC and DC. Because they will develop destructively high speeds under no load, they are usually used as integral motors in hand power tools or for specific applications where they will be under constant, pre-determined load.

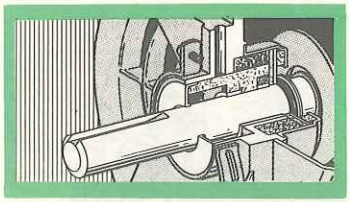
All General-Purpose Split-Phase

HAVE THESE

LIFETIME LUBRICATION



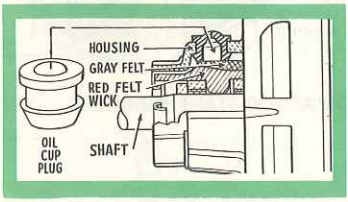
All ball-bearing motors have bearings sealed in with a special formula, top-quality grease that assures long, trouble-free service.



The 2-pole sleeve-bearing motors are fitted with 100% felt wicking that holds a large reserve of oil in suspension and distributes oil over bearing surface. Oil slingers on shaft prevent leakage.

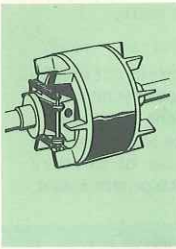
Both above types require no lubrication throughout normal motor life.

LEAK-PROOF OILER



General-purpose sleeve-bearing motors have a new type oil-cup plug securely fitted into the end shield to provide constant pressure between the felt wick and motor shaft. Plug is self-sealing, leakproof; the improved wick and packing assure ample oil storage and uniform distribution.

EXTRA COOL OPERATION



Either an extra large "booster" fan with baffles (2-pole models), or two fans — one at each end (all other models) provide positive motor cooling. The resulting uniform, top-efficient cooling helps prevent motor burnout.

TOUGH MYLAR INSULATION

Has 35 times greater moisture resistance and 8 times greater physical strength than ordinary insulation . . . gives maximum protection.

DEPENDABLE STARTING

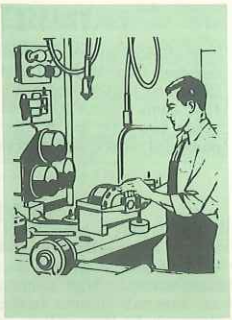
Improved type centrifugal governors assure "sure-fire" starts — every time — and longer trouble-free life.

NEMA-TYPE BASES

All motors have NEMA standard mounting bases . . . which assures easy, simple application on any equipment manufactured with provisions for NEMA-type mounting.

PERFORMANCE TESTED

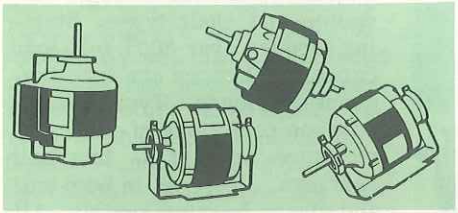
Each motor is individually tested before it is packed to ensure maximum performance and quality. Each design of motor is built to perform at the very top of its NEMA band rating . . . thus ensuring full rated HP and performance.



and Capacitor Motors (Pages 8-9)

SEARS FEATURES

ANY POSITION OPERATION



New, improved oil retention designs of all sleeve-bearing motors now makes it unnecessary to mount such motors upright. With this new feature *all* Sears motors (sleeve as well as ball bearing) can be mounted in any position . . . with shaft up, down, or at any angle!

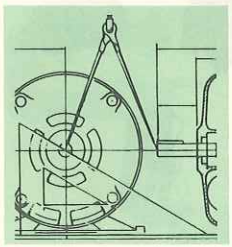
BUILT-IN GROUND LUG & CONDUIT CONNECTION

These make it easy to make permanent ground connection and/or conduit line connections.

LIGHT-WEIGHT, HEAVY-DUTY CONSTRUCTION

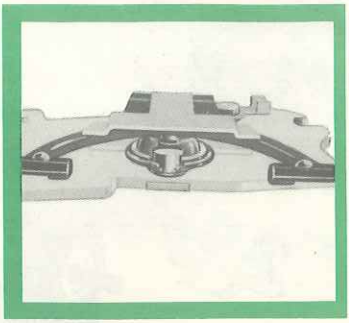
Streamline designs reduce weight up to 30% . . . but increase ruggedness and service life of motors. 2-pole models have fully guarded, strong die-cast shells. Other models have new full-size, straight shafts that provide larger bearing surfaces . . . also, improved rotor design that eliminates all electrical noises.

CUSTOM ENGINEERED



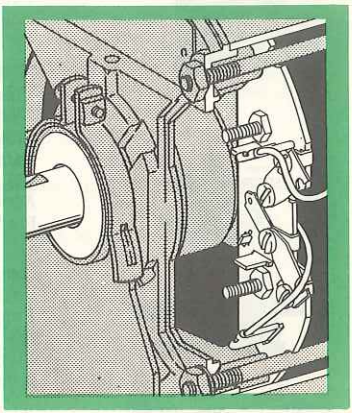
Each motor is custom designed for a specific line of applications. No compromises are necessary with this complete Sears line. There is a motor designed for every job.

DUST-PROOF SWITCH



Sawdust, lint and other foreign matter cannot cause motor failure because all vital contact points are permanently shielded and protected. This important feature gives Sears fractional hp motors a marked superiority for many tool, appliance and blower applications.

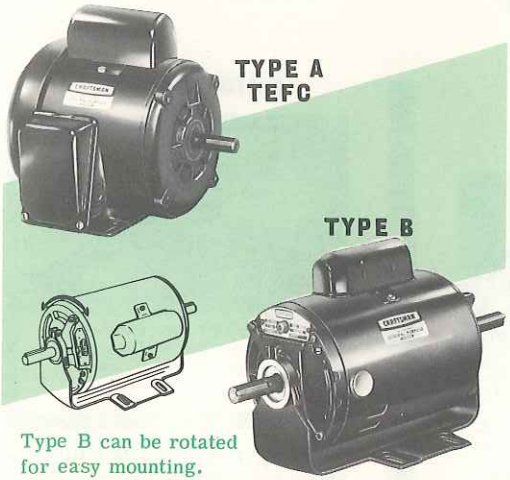
QUICK-CONNECT TERMINALS



Simplified, readily accessible terminal board with plug-in, quick-connect wiring tabs cut wiring time in half. These make it easy to reverse rotation or to change for voltage on models designed for 115/230V.

SEARS POWER TOOL AND

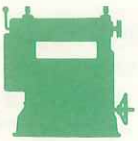
HIGH-TORQUE CAPACITOR TYPES



Type B can be rotated for easy mounting.

Both 1725 rpm and 3450 rpm *Capacitor Motors (p. 5)* for hard-to-start loads, with low starting amps. All for 115/230 V., 60 cyc. AC. Single and double-end shaft types. Starting torques over 300% full-load capacity. Motors can take frequent overloads. Type A is for adverse conditions of excessive moisture or dirt — has ball bearings. Type B in both ball and sleeve bearing models. All have manual reset overload protectors; are easily reversed.

TYPICAL USES

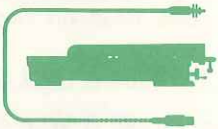


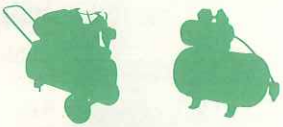
1/3 HP
Planer-Jointers to 4-3/8"
Drill Presses to 1/4"
Fans to 21" Diameter
Air Comp. to 1 cu-ft./min.
Feed Mixers to 3-cu-ft.
Pumps to 400 gpm at 10 ft.

1/2 HP
Jointer-Planers to 6-1/8"
Thickness Planers to 6"
Wood Shapers
Comb. Belt-Disc Sanders
Paint Sprayers
All Flexible Shafts
Air Comp. to 1-1/2 cu-ft./min.
Port. Concrete Mixers

3/4 HP
Bench Saws to 8"
Drill Presses to 1/2"
Fans to 42" Diameter
Air Comp. to 2-1/2 cu-ft./min.
Pumps to 1000 gpm at 10 ft.
Larger Sprayers

1 HP
Bench Saws to 12"
Floor Saw, 10"
Thickness Planer, 12-1/4"
18" Band Saw
Insect Sprayers to 1-1/2 gpm
Work Bench Line Shafts

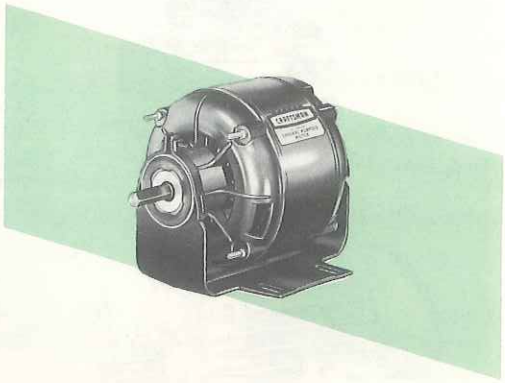




GENERAL - PURPOSE MOTORS

MEDIUM-TORQUE SPLIT-PHASE TYPES

These are all 4-pole (1725 rpm) *Split-Phase Motors*, as described on *page 5* . . . for not-too-hard to start loads where high starting current is no problem. All are for 120V, 60-cycle AC, and have single-end shafts and sleeve bearings. These motors are easily reversed and most models have flexible mountings for quiet operation. All have the appropriate features listed on *pages 6-7*.



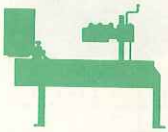
TYPICAL USES

1/2 HP

Fans & Blowers to 36" Diameter
Air Compressors to 1 cu-ft/min.

1/3 HP, RIGID BASE

Wood Lathes, 12" Swing
12" Band Saw
18" Jig Saw
12" Disc Sander
4" Belt Sander
Drill Presses, under 3/8"
Wet Grindstone
Grinder-Hone Comb.
Grinders & Buffers to 8" Diameter
All Hacksaws
Metal Lathes to 12" Swing
All Gem Makers

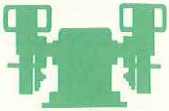


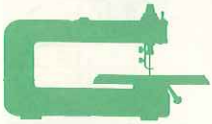
1/3 HP, RESIL. BASE

Fans & Blowers to 24" Diameter
Air Compressors under 1 cu-ft/min.

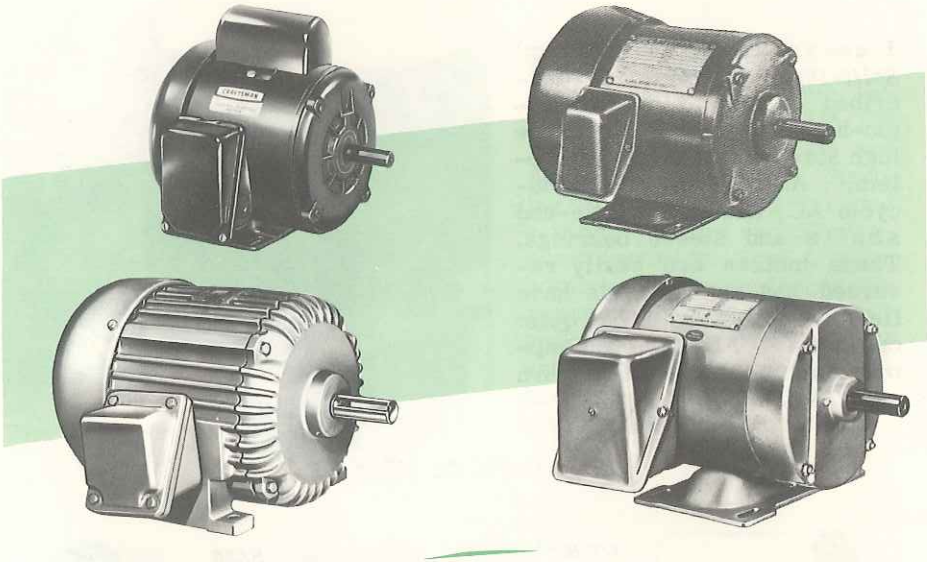
1/4 HP

Disc Sanders under 12"
Grinders & Buffers under 8" Diameter
Jig Saws under 18"
Small Wood Lathes
Drill Presses to 1/4"
Fans & Blowers to 18" Diameter
Air Compressors to 1/2 cu-ft/min.



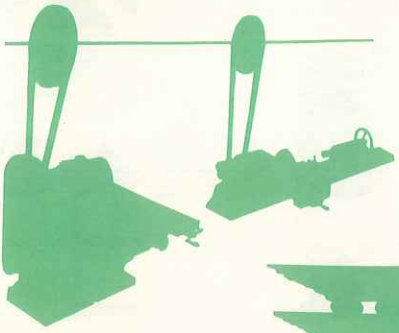


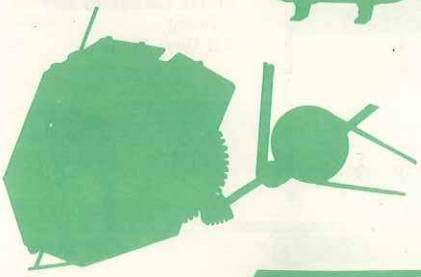
HEAVY-DUTY FARM



TYPICAL USES

Pumps — all types
Air Compressors
Blowers
Coolers
Large Machine Tools
Conveyors
Feed Grinders and Mixers
Hoists and Lifts
Refrigeration Equip.
Milking Machines
Other Farm Machinery
Construction Equip.





& INDUSTRIAL MOTORS

TEFC MOTORS (Totally-Enclosed, Fan-Cooled)

All motors in this group are ideal for indoor or outdoor use under all weather conditions. Max. 55° C. Temp. rise. There are four types:

CI - Cap. Start, Ind. Run for 115/230V, 60-cyc. AC. Sizes: 1 to 3 hp, 1725 rpm; 2 hp, 3450 rpm. Starting torque up to 350% of full load.

RM (brush riding) and *RL* (brush lifting) - Rep-Ind. types for 115/230V, 60-cyc. AC. Sizes 1/2 to 7-1/2 hp, 1750 rpm. Starting torque 450%.

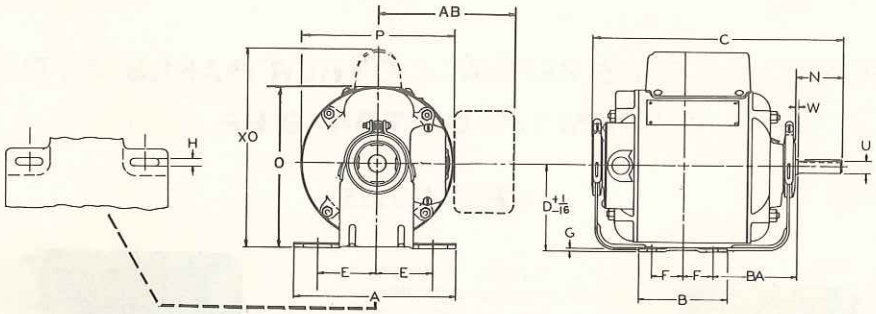
3-Phase - Brushless, Ind. type for 208-220/440V, 60/50-cyc., 3-ph. AC. Sizes: 5 to 40 hp, 1800/1500 rpm. Up to 500% starting torque.

OPEN VENTILATED MOTORS

RLC - - Rep. Start, Cap. Run for 230V, 60-cyc. AC. Brush lifting. Sizes: 10 and 15 hp, 1750 rpm. Starting torque up to 500% of full load.

All above types have prelubricated ball bearings, single-end shafts, are built for continuous duty under most severe farm and industrial conditions — where low voltage and low starting current are factors.

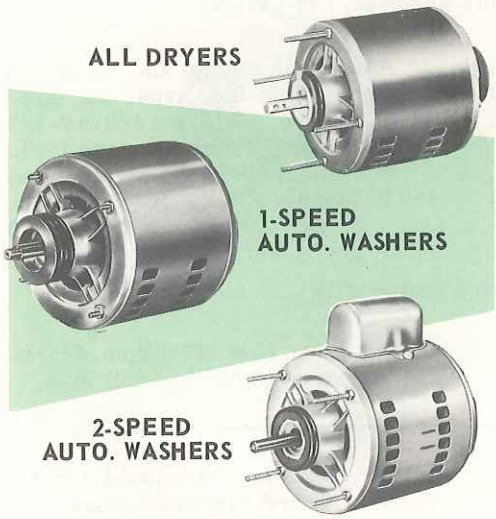
STANDARD NEMA FRAME DIMENSIONS IN INCHES



FRAME	A	B	±B	C	D	E	F	G	H	N	P	U	W	BA	XO	KEY
48	5⅝	3½	3½	9 7/16	3	2⅛	1⅜	3/32	11/32	1 9/16	5⅝	½	1/16	2½	7 5/16	3/64 x 1¼ Flat
56	6½	3¾	3 13/16	10 5/16	3½	2 7/16	1½	⅛	11/32	1 15/16	6 3/16	5/8	1/16	2¾	8⅛	3/16 sq. x 1⅜
66	–	–	–	–	4⅛	2 15/16	2½	–	13/32	2 15/16	–	¾	1/16	3⅜	–	3/16 sq. x 1⅞
FRAME	A	B	C	D	E	F	G	H	N	O	P	U	W	BA	AB	KEY
182	9	6	13⅝	4½	3⅜	2¼	3/16	13/32	2⅜	8 9/32	7 17/32	⅞	⅛	2¾	6 5/16	3/16 sq. x 1⅜
184	9	7	14⅝	4½	3⅜	2¾	3/16	13/32	2⅜	8 9/32	7 17/32	⅞	⅛	2¾	6 5/16	3/16 sq. x 1⅜
213	10½	7	15 15/16	5¼	4¼	2¾	¼	13/32	3 3/16	9¾	9	1⅛	3/16	3½	7 1/16	¼ sq. x 2
215	10½	8½	16 15/16	5¼	4¼	3½	¼	13/32	3 3/16	9¾	9	1⅛	3/16	3½	7 1/16	¼ sq. x 2
254U	12¼	10½	20 5/16	6¼	5	4⅛	¼	17/32	3 15/16	11 9/16	10⅝	1⅜	3/16	4¼	7 29/32	5/16 sq. x 2¾
256U	12½	12½	22 5/16	6¼	5	5	¼	17/32	3 15/16	11 9/16	10⅝	1⅜	3/16	4¼	7 29/32	5/16 sq. x 2¾
326U	16	14¾	31⅝	8	6¼	6	⅞	21/32	5⅞	16¾	17 27/32	1⅞	¼	5¼	13⅛	½ sq. x 4¼
364U	16¾	14 7/16	33⅛	9	7	5⅝	1⅛	21/32	6⅝	18	17¾	2⅛	¼	5⅞	13½	½ sq. x 5
567	6½	4	12⅝	3½	2 7/16	1½	⅛	11/32	1 15/16	6 31/32	6 15/16	⅝	1/16	2¾	4⅝	3/16 sq. x 1⅜
568	6½	4	13⅛	3½	2 7/16	1½	⅛	11/32	1 15/16	6 31/32	6 15/16	⅝	1/16	2¾	4⅝	3/16 sq. x 1⅜

±Rubber mount.

SPECIAL APPLICATION LAUNDRY



FOR

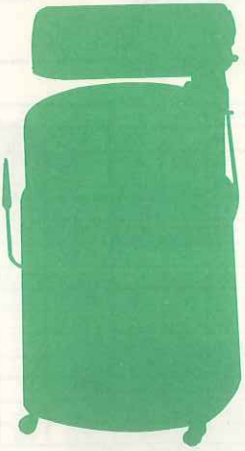
LAUNDRY EQUIPMENT

Sears laundry equipment replacement motors will fit all Kenmore and Whirlpool models. All are 1/3 HP to assure full power and peak performance of equipment. Single-speed models operate at 1725 rpm; 2-speed operate at 1140/1725 rpm. All except the wringer-washer motor are equipped with automatic reset overload protectors. All are designed for 110-120V, 60 cyc. AC . . . have the quality features shown on *pages 6-7*.

SEARS MOTORS REPLACE OTHER MAKES RATED FROM 1/8 UP TO 1/3 HP

TYPICAL USES

Wringer-Washers
Automatic Washers
Gas and Elec. Dryers



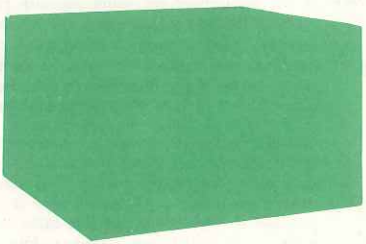
OTHER APPLICATIONS

Sears fan, blower, oil burner and other equipment motors offer maximum power at lowest cost . . . assure best possible, long-life operation of equipment. Such features as capacitor starting, automatic or manual reset overload protection, two-speed operation, reversibility, special mounting and shaft design, etc. are built into each motor as required by the application. Single-speed models, 1725 rpm; 2-speed, 1140/1725 rpm. All are for 110-120V., 60 cyc. AC . . . have quality construction shown on *pages 6-7*.

SEARS MORE POWERFUL MOTORS GIVE BETTER PERFORMANCE — AT LOWER COST

TYPICAL USES

Cellar Drainers
Jet Pumps
Oil Burners
Belted Fans and Blowers
(Single and 2-speed)
Evaporative Coolers
(Single and 2-speed)



IF SPECIAL SELECTION

Consider the electrical and physical characteristics required, and choose a motor accordingly. Always buy a motor as big or bigger (in horsepower) than called for. Extra horsepower, within reason, never hurts; too little horsepower can result in inefficiency and motor burnout. A gasoline engine can be replaced by an AC motor of 75% the size (in HP).

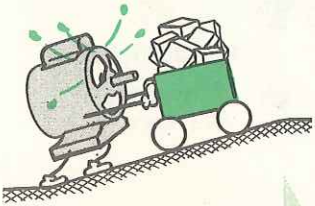
ELECTRICAL CHARACTERISTICS

These will usually be found on the motor nameplate.

HORSEPOWER (HP)

If you push a car from a standing start on a level road, it takes an extra effort to start the car, then a smaller (but steady) effort to keep it rolling — with occasional spurts of extra effort (again) as the car rolls over bumps. It's the same with a motor attached to a load. Therefore a motor is said to be capable of so much *starting torque* (push), so much *running torque* and so much *overload torque. Breakdown torque* (its maximum push, beyond which it stalls) is also used.

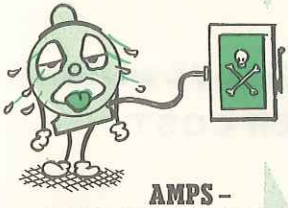
Motor torque is measured by horsepower, The *rated HP* of a motor is its running torque, *at normal running speed.* That is, a motor rated at 2 HP can pull with the strength of two horses — for all of its life. At starting, or when required to give an extra spurt of effort, it is said to be *overloaded* — and the safe *overload capacity* of a motor is usually stated as so many (say 2 or 5) times the rated HP. But this overload capacity is only a *temporary* one because a motor heats up rapidly, and may burn out, *if overloaded too long or too much.*



TYPE OF CURRENT

It is very important to most motors whether you connect them to DC or AC, whether AC is single-, 2- or 3-phase — and whether the voltage is 115 or some other amount. Each is generally designed to run on a certain current with voltage of approximately a certain amount. Actually, there is a loss of voltage in power lines and Power Companies cannot always deliver exact voltages. Therefore, most motors are made to allow 10% voltage variation without harm; but the voltage should not be allowed to drop more than this (except that R-I and 3-Phase Motors can stand greater drops).

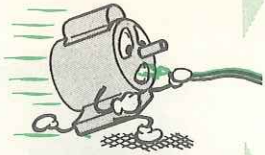
"Feeding" a motor a wrong current or wrong voltage will, at best, reduce its efficiency and life — at worst, can burn it up. It is particularly dangerous to an Induction motor to connect it to a DC line.



AMPS – STARTING AND RUNNING

Just as you need a certain amount of food to keep going, so a motor needs a continuous supply of amps. And like you, when it works hardest, it needs an extra amount. Therefore, we say that a motor requires *so many amps at starting* (or for temporary overloads), and *so many* (generally only 1/3 to 1/4 of the starting amps) *for normal running.*

If you connect to the right power supply you needn't worry about having enough amps; but you do have to think about the size wires you use between the power source and your motor (wires that are too small can't carry enough amps). When choosing these wires, be sure to have them big enough *to carry the starting amps,* not just the running amps.



RPM AND DIRECTION OF ROTATION

Induction-type motors run at practically constant speed (unless so overloaded as to stall) — and each is therefore rated according to the rpm (revolutions per minute) which its shaft will turn. The two commonest are approx. 1725 and 3450 rpm. You can, of course, obtain higher or lower speeds at the equipment by using various pulley sizes or gears; but it is often inconvenient to change an arrangement already planned for you by the manufacturer. Therefore, it's best to get a motor with the recommended rpm.

For the same reason, you can avoid trouble by getting a motor that revolves in the right direction (clockwise or counterclockwise). However, this is not too important with Sears motors as all can easily be reversed.

RUNNING TIME AND TEMPERATURE RISE

Though seldom indicated on a nameplate, you may have heard these terms. They refer to the "heating characteristics" of a motor. Every motor heats up as it runs (*temperature rise*). This rise is not critical unless a motor is overloaded too long — in which case it may overheat and burn out. Special purpose motors are sometimes built to run a while, then stop and cool a while — in which case *running time* is stated.

BECOMES NECESSARY

N.E.M.A. means National Electrical Manufacturers' Association — the organization which coordinates the standardization of motor ratings and dimensions.

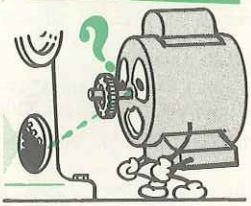
WHAT IS MEANT BY NEMA

PHYSICAL CHARACTERISTICS

The physical characteristics of a motor (its size, shape, etc.) can be just as important as its electrical characteristics, if it must fit a certain space or drive a specifically designed piece of equipment. Some of a motor's physical characteristics are listed in catalog specifications — others must be observed by looking at the motor, and perhaps by taking measurements.

SIZE AND SHAPE

Obviously, if you have limited space in which to install your motor, size and shape are very important. Not only must you consider whether or not the motor will fit in — it's also important for it to *have room to "breathe"*. All motors require a free circulation of air, to keep from overheating. *Don't* squeeze one into a space so tight that it will "suffocate" in its own heat!

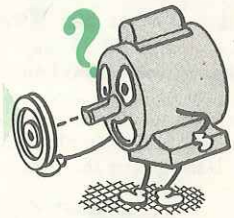


TYPE AND SIZE OF BASE

Different motors are provided with different types of mounting arrangements. Usually, you can adapt a motor to most any special mounting requirement (if there's room); but much time and trouble can be saved by getting a motor that will mount where you want it without alteration.

HEIGHT OF SHAFT

When considering the type of base, consider also the height at which the shaft sets above the base. If it is too high, you may have difficulty locating the motor so that it can be connected to your equipment.



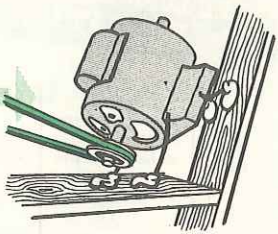
KIND OF SHAFT END

Motor shafts come in different sizes (½ in., ⅝ in., etc.) — and are of different types. For securing a pulley or tool to be driven by the motor, a shaft is generally slotted — for a key — or flattened (beveled) for use with set screws. Special shafts have detents (depressions for set screws), threads, holes (for pins), etc. If you don't have the right shaft, it's difficult to connect a motor to its load.

Some motors have a shaft at each end (instead of just one end) — which may be quite an advantage for certain purposes.

TYPE OF BEARINGS

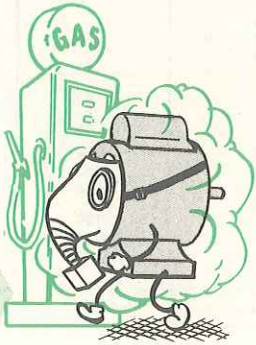
Generally, there are two types of bearings: Ball and Sleeve. The ball bearings will "take" greater thrust loads and abuse, will run quieter and longer... are usually sealed in grease so that no lubrication is required. Ordinary sleeve bearings restrict a motor to one "upright" mounting position since the oil cup must be above the bearing. However, Sears improved sleeve bearings receive oil and allow the motor to be mounted in any position.



THERMAL OVERLOAD PROTECTOR

When a motor becomes overloaded, it meets the increased demand for power by drawing a higher amperage. This can go on until it is overloaded to the point of stalling — and it will then draw an excessive amperage, so much (in fact) that either the motor or the wires to it will burn up if this condition is not corrected. A fuse in the circuit to the motor will correct this condition, by "blowing" to open the circuit.

Some motors, however, have a built-in *thermal overload protector,* which acts like a fuse to open the circuit, but is more convenient. Two kinds are used: 1) *Automatic Reset* (which closes the circuit again when motor has cooled sufficiently); and 2) *Manual Reset* (which can be closed by hand when the motor is cool enough).



SPECIAL HOUSINGS

The average motor housing is built to provide good protection for the motor (from dust and dirt) under normal conditions of motor operation around a home, office or plant. However, special conditions must sometimes be met — as when a motor must run in the presence of explosive fumes (around a gasoline depot). Housings designed for every conceivable special condition are available — but, remember, you must order them specifically.

ELECTRICAL REQUIREMENTS

USE LARGE ENOUGH WIRE, SWITCHES, ETC.

Importance of "Safe" Size

All wires and electrical devices (switches, receptacles, etc.) are designed to carry up to a specified *load* (no. of amps). Overloads may: 1) Cause wires or devices to burn out — with danger of fire; 2) Cause excessive *voltage drop* (loss of voltage at motor) so that motor runs inefficiently, overheats, and could burn out. Voltage drop *should be held to* 5% max. for R-I and 3-Phase motors; to 2% max. for all other motors.

Figuring Loads

For a motor, use the "Amps" shown on nameplate —*and add* 30% for safety. Other appliances are usually rated in *watts*. Amps $= \frac{\text{watts}}{\text{volts}}$ (i.e.: a 60 watt bulb on a 115V circuit $= \frac{60}{115} = 0.5$ amps).

Selecting Devices and Wires

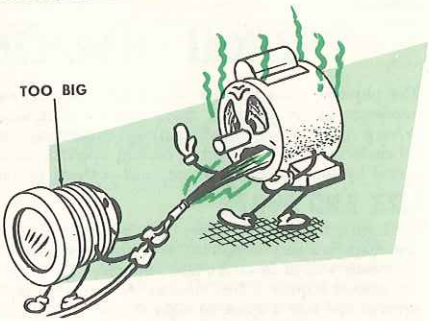
Devices are labeled in amps. Wires are rated *by diameters* with AWG (Am. Wire Gage) Nos.; *by type* (of covering); and *by length*. A wire may be just right to carry a certain load for (say) 50 ft; but not to carry it 100 ft. Reason: the longer a wire is the greater the voltage drop at its end.

WIRE LOAD RATINGS (IN AMPS) FOR 50 FT LENGTHS

Wire Size (AWG)	Armored or Non-Metallic Cable — or Indoor Wire in Conduit	Indoor Wire (Knob & Tube)	Outside Wiring
14	15	20	30
12	20	25	40
10	30	40	55
8	45	55	70
6	65	80	100
4	85	105	130
2	115	140	175
1	130	165	205
0	150	195	235

LARGER — SMALLER

Ratings in table are for 50 ft lengths of 2-wire cable or extension cord — or 100 ft of single wire. Increase wire by one size for each added 50 (or 100) ft, or fraction thereof. Never use smaller than 14 wire — or ordinary extension cord — for permanent wiring.



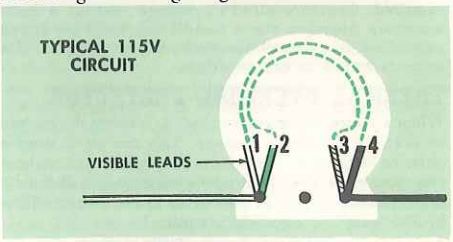
USE A SMALL ENOUGH FUSE

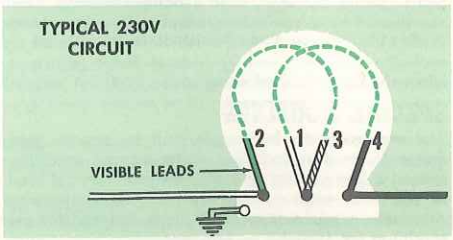
Every motor deserves the protection of an individual fuse or circuit breaker designed to "blow" before motor can be damaged. Because the starting amps required are much greater than the *normal running amps*, a standard fuse big enough not to blow every time motor starts is much too big to protect motor against burn out from continuous overloading. Therefore, *only a Time-Lag type of fuse* will protect your motor. Use one rated the same as the "Amps" on motor nameplate, plus *not more* than 25%. On 115/230V circuits, use 2 fuses; use 3 on a 3-phase circuit.

FUSES ARE CHEAPER THAN MOTORS!

MAKING CONNECTIONS AT MOTOR

Your Sears motor will have a cord and plug, or a conduit box with colored wire leads inside it. If there are leads, splice them to the circuit wires *according to wiring diagram on motor.*





CONNECTING TO AN EXISTING CIRCUIT

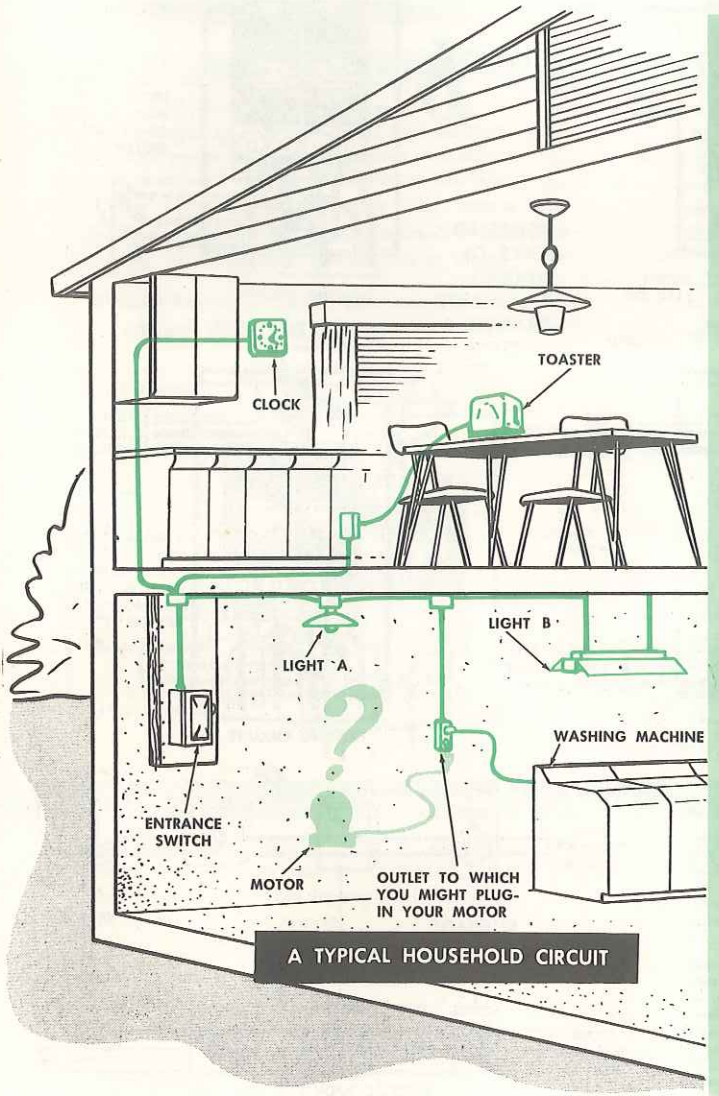
Before plugging-in or splicing a motor branch circuit to an existing circuit, check the wire (etc.) sizes — and check the load already on the circuit.

1. Some appliances will be OFF while others are ON. Just total the amps for those *which could be ON simultaneously.*

2. A ¼ or ⅓ HP motor can generally be added to an average household circuit without overloading it — and a ½ or ¾ HP motor probably can if there are *no other motors or heating appliances* on the circuit. Larger motors usually require a separate circuit.

3. Open the circuit by removing the fuse (or fuses) which controls it.

4. If circuit has a standard fuse(s), substitute Time-Lag fuse(s), or install one in the separate line to motor — unless motor has built-in overload protection.



A TYPICAL HOUSEHOLD CIRCUIT

TOTALING THE WATTS FOR THE CIRCUIT SHOWN

ITEM	WATTS
Clock	0.50
Toaster	1100.00
Lamp A	100.00
Lamp B	40.00
Wash. Mach.	400.00
TOTAL	1640.50

AVERAGE RATINGS

APPLIANCES	WATTS
Clothes Dryer	1500-4500
Coal Stoker	300
Coffee Maker	650-1000
Dishwasher	300
Elec. Blanket	200
Fan-Table	75-150
-Ventilating	150-550
Fluores. Tubes	15-50
Food Mixer	150
Freezer (home)	350
Grill (large)	660-1000
Heater-Water	3000
-Room	1000 Up
Iron	1000
Ironer	1650
Light Bulbs	As Marked
Radio-Phono.	100
Range (kitchen)	7000-14000
Refrigerator	250
Roaster (large)	1650
Shaver	10
Stove (table)	1650
Television	500
Toaster (auto.)	1100
Vacuum Clnr.	400
Waffle Iron	660
Wash. Machine	350-450
Water Pump	300

1-PHASE AC MOTORS	NORMAL-RUN AMPS	
HP	115V	230V
1/6	3.2	1.6
¼	4.6	2.3
⅓	5.6	2.8
½	7.4	3.7
¾	10.2	5.1
1	13.0	6.5
1½	18.4	9.2
2	24.0	12.0
3	34.0	17.0
5	56.0	28.0

PROVIDING A NEW BRANCH CIRCUIT

A new branch circuit is one *starting at your entrance switch* — and may be installed if switch has provision for an additional circuit. Just remember:

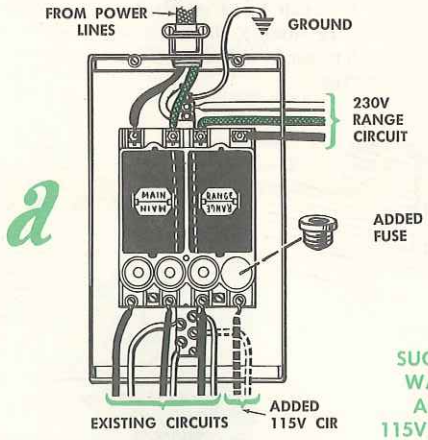
1. If spare terminals are exposed and you can connect to entrance switch without disassembling it, simply open the switch to simultaneously *shut off all house current.* If you must disassemble switch *or touch any wire leading into it,* first have Power Co. shut off your service.

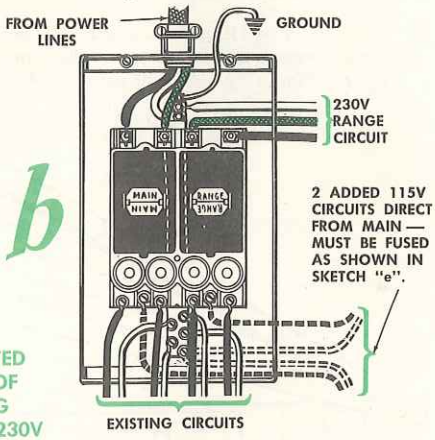
2. Complete the new wiring *before* connecting it to entrance switch.

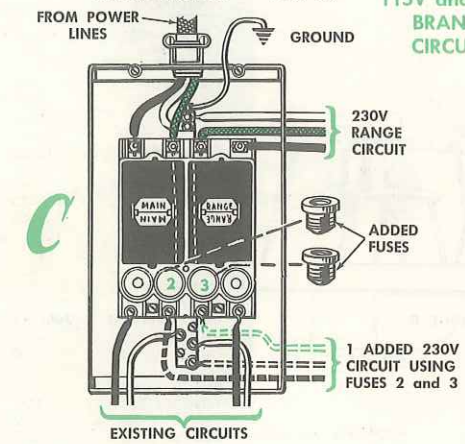
3. Check to see that spare terminals in entrance switch are intended to carry load you will connect to them. Usually, fuse sizes are indicated on the switch cover — and you can tell from this:

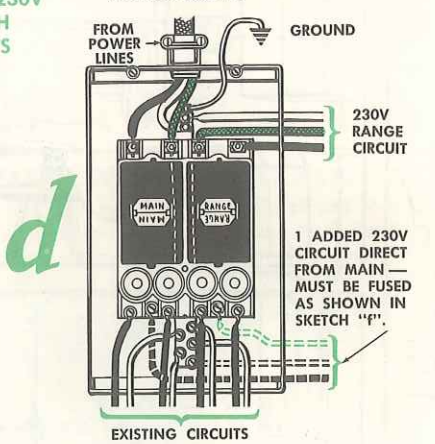
4. If motor will operate on 115/230V, *choose 230V* whenever possible.

SUGGESTED WAYS OF ADDING 115V and 230V BRANCH CIRCUITS




b
FROM POWER LINES
GROUND
230V RANGE CIRCUIT
2 ADDED 115V CIRCUITS DIRECT FROM MAIN — MUST BE FUSED AS SHOWN IN SKETCH "e".
EXISTING CIRCUITS

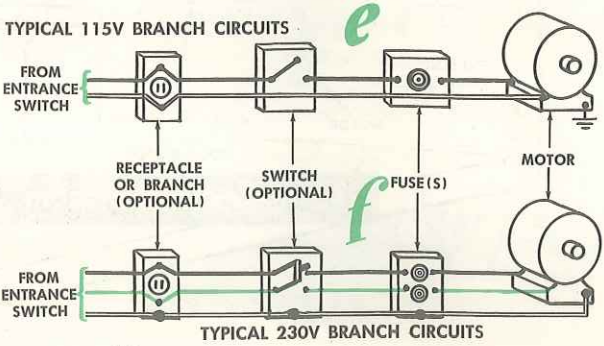


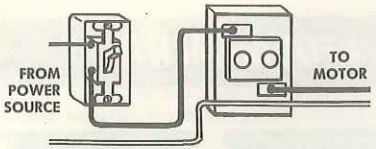

d
FROM POWER LINES
GROUND
230V RANGE CIRCUIT
1 ADDED 230V CIRCUIT DIRECT FROM MAIN — MUST BE FUSED AS SHOWN IN SKETCH "f".
EXISTING CIRCUITS

NOTES

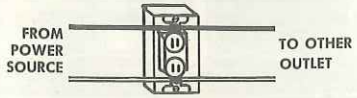
Fuses, as shown, must be used if connections at the entrance switch are made as in sketches "b" and "d" — otherwise, fuses are optional (but recommended if receptacles or branch lines are used as shown in sketches "e" and "f".

In a 230V circuit the white (neutral) wire should be grounded to each outlet box, switch box (etc.) — and to each motor housing, as shown. However, 2-wire circuits can be used (omitting neutral wire) if neutral wire is grounded at entrance switch — and if each box and motor housing is also properly grounded.

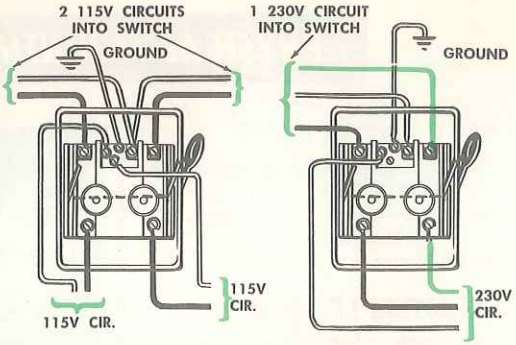




CONNECTIONS TO A SWITCH AND TO A FUSE CABINET



CONNECTIONS TO A RECEPTACLE



CONNECTIONS TO A SAFETY SWITCH (WITH FUSES)

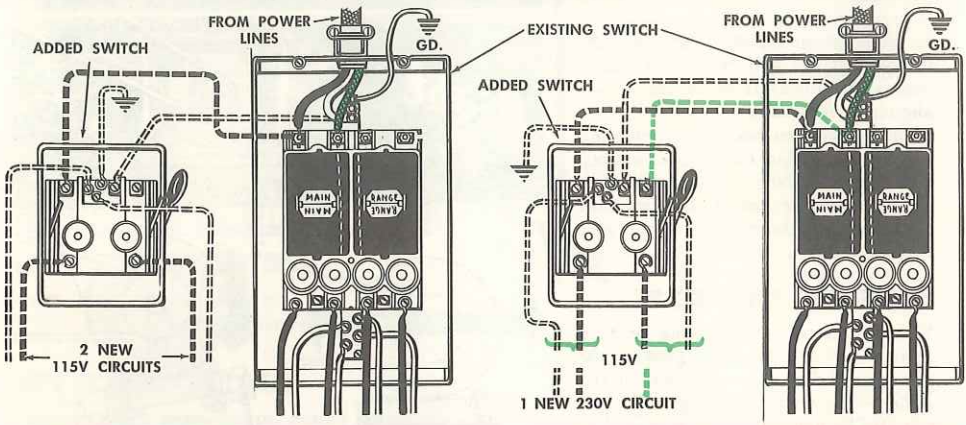
PROVIDING A NEW MAIN CIRCUIT

If the existing circuits and entrance switch are loaded to capacity — or if you need 230V and have only 115V — you will have to install a new service switch connected directly to the Power Co. lines.

1. Use any suitable size switch and mount this conveniently near the existing entrance switch. Complete all wiring from new switch to motor.

2. Have Power Co. connect new switch to their line — or have them *shut off the power* while you make the connection.

3. If lines entering original switch are large enough (Power Co. will advise), you can connect new switch to these lines inside the original switch, as shown. Otherwise, you must provide new lead-in wiring to a Service Entrance Head (or Yard-pole, on a farm). Complete instructions are given in Sears' booklet "Electric Wiring for Home or Farm" on sale in our Elect. Appliances Dept. for a small sum.



SAFETY NOTES

Never work with existing wires or equipment without *first making certain power is OFF.*

Check local codes before buying wire or equipment — or doing any wiring.

Avoid long extension cords — they are subject to damage.

For wiring in barns (*where dampness and manure fumes rapidly deteriorate ordinary wires and metal*) we recommend use of our Single Wire Trench Cable with Knob and Tube installation together with Bakelite Surface Wiring Devices. Open wiring permits frequent inspection.

Never install devices where someone must stand in dampness or close to machinery to operate them.

In stringing long wires remember to *support weight of wire* properly — and *allow slack* to take up the contraction of wire in cold weather.

PHYSICAL MOUNTING REQUIREMENTS

PRE-MOUNTING CHECK

To check against shipping damage, rotate the shaft *with your fingers* — it should turn freely. Now operate the motor *without load* — it should run smoothly with a low electrical hum.

SELECTING LOCATION

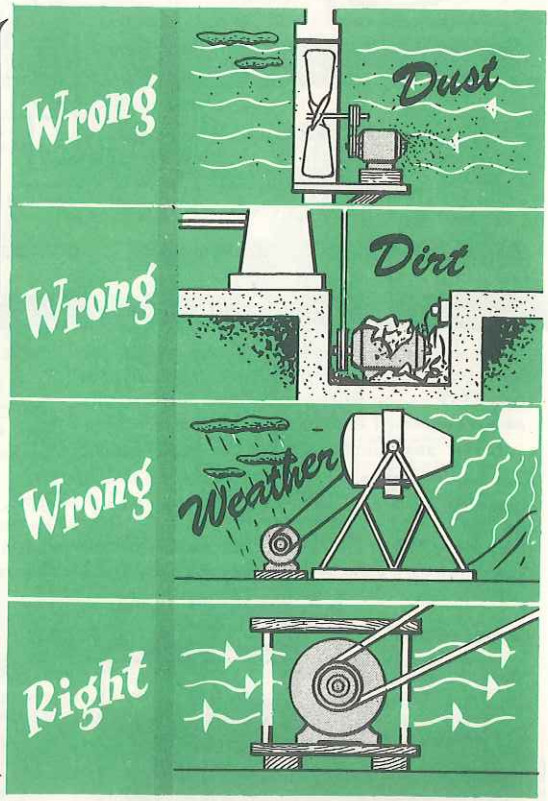
Locate motor where it will be as *dry and cool* as possible. Do *not* expose it to weather, *nor* enclose it so that it doesn't get free air circulation. (Wire screens around a motor may become clogged and shut off circulation). Also, don't install it where possible sparks could ignite grain dust or similar inflammables — unless it is a special enclosed type.

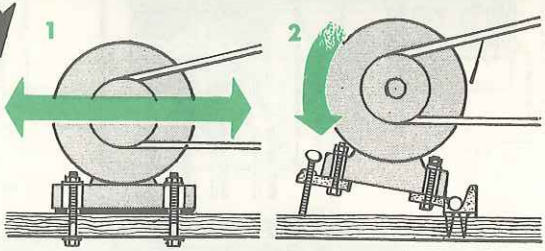
MOUNTING

Bronze bearing motors *should be mounted horizontally* — to prevent the oil from draining out of the oil cups. Ball bearing motors may be mounted in any position.

If quiet operation is desired, motor may be mounted on rubber or spring cushions — but this will cause it to "float" and is not advisable when exact shaft alignment is required.

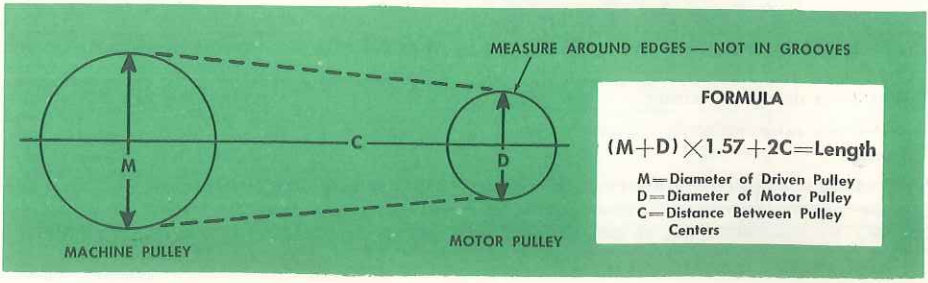
There are two methods of maintaining belt tension. 1) Use the motor base slots, and slide the motor to tighten the belt. 2) Use a *motor rail* as illustrated. In either case, make the retaining bolts secure.



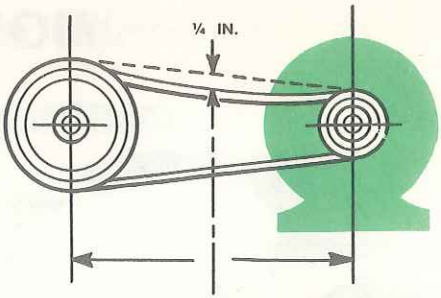


MEASURING FOR V-BELTS

You can measure with string or tape around the outside edges (*not in the grooves*) of the motor pulley and driven pulley — to obtain belt length. Length can also be figured as shown in accompanying illustration.



A belt should be just tight enough so that finger pressure midway between pulleys will deflect it about ¼ inch. If too loose, slippage of the pulleys will wear it out. If too tight, it increases motor load and wear on the bearings.



SELECTING PULLEYS

V-pulleys are measured from edge to edge (*not in groove*). The following table gives you the speeds of driven pulleys when using various combinations of drive and driven pulley sizes (in inches).

* DRIVEN PULLEY SPEEDS IN RPM

DIAM. MOTOR PULLEY	DIAMETER OF PULLEY ON MACHINE, INCHES														
	1¼	1½	1¾	2	2¼	2½	3	4	5	6½	8	10	12	15	18
1¼	1725	1435	1230	1075	950	850	715	540	430	330	265	215	175	140	115
1½	2075	1725	1475	1290	1140	1030	850	645	515	395	320	265	215	170	140
1¾	2400	2000	1725	1500	1340	1200	1000	750	600	460	375	315	250	200	165
2	2775	2290	1970	1725	1530	1375	1145	850	685	530	430	345	285	230	190
2¼	3100	2580	2200	1930	1725	1550	1290	965	775	595	485	385	325	255	215
2½	3450	2870	2460	2150	1900	1725	1435	1075	850	660	540	430	355	285	240
3	4140	3450	2950	2580	2290	2070	1725	1290	1070	800	615	515	430	345	285
4	5500	4575	3950	3450	3060	2775	2295	1725	1375	1060	860	700	575	460	375
5	6850	5750	4920	4300	3825	3450	2865	2150	1725	1325	1075	860	715	575	475
6½	8950	7475	6400	5600	4975	4480	3730	2790	2240	1725	1400	1120	930	745	620
8		9200	7870	6900	6125	5520	4600	3450	2750	2120	1725	1375	1140	915	765
10			9850	8620	7670	6900	5750	4300	3450	2650	2150	1725	1430	1140	950
12					9200	8280	6900	5160	4130	3180	2580	2075	1725	1375	1140
15							8635	6470	5170	3970	3230	2580	2150	1725	1425
18								7750	6200	4770	3880	3100	2580	2070	1725

* DRIVEN pulley speed based on use of a 1,725 rpm motor. For a 3,450 rpm motor double the speeds listed. The formula for figuring speeds is:

$$\frac{\text{Dia. of Drive Pulley}}{\text{Dia. of Driven Pulley}} = \frac{\text{Speed of Machine}}{\text{Speed of Motor}}$$

PRECAUTIONS THAT WILL SAVE YOUR MOTOR

DON'T OVERLOAD MOTOR

Overloading a motor can burn it out. *Don't expect it to run continuously overloaded.*

DON'T LET VOLTAGE DROP

When voltage at motor drops, exactly the same thing happens as when the motor is overloaded. With too little "fuel" it is (in effect) overworked — heats up — and will burn out. Use ample size wiring.

DON'T "SUFFOCATE" MOTOR

If free circulation of air to a motor is restricted (by dirt, rags or paper, or closing it up in a box) it overheats — may burn out. *Keep motor clean, and dry.*

If used where wood chips, dust, etc. can enter inside, blow out the interior with dry compressed air — or use a vacuum cleaner.

GROUND MOTOR PROPERLY

The motor frame should be connected, by wire of same size used in line to motor, to a suitable ground (water pipes or a grounding rod properly installed) — both to protect you, and to protect the motor in case of an internal short circuit.

LUBRICATE MOTOR PROPERLY

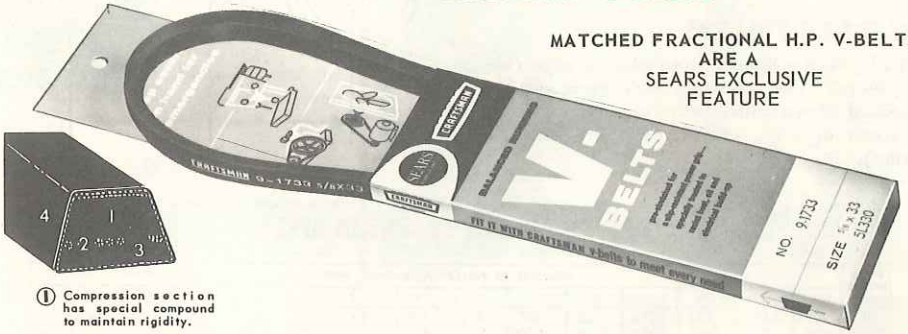
Motors with bronze bearings do require occasional — *but not too frequent or excessive* — lubrication. It's best to check yearly and add a few drops each time. *Too much oil* can cause trouble by getting out of the bearing into the motor.

USE RE-SET PROPERLY

If you have an overload protector with a manual reset button, always *wait for motor to cool before* using the re-set. *Never* hammer the re-set (if it seems to "stick"), as this will break off the switch parts. Any trouble with re-setting will probably be due to dust between the contacts — and blowing away the dust, or simply holding the button in firmly, will correct this.

MOTOR ACCESSORIES . .

CRAFTSMAN MATCHED V-BELTS



① Compression section has special compound to maintain rigidity.

② High-tensile rayon cord coated with rubber compound.

③ Blend of natural and synthetic rubbers in the tension section.

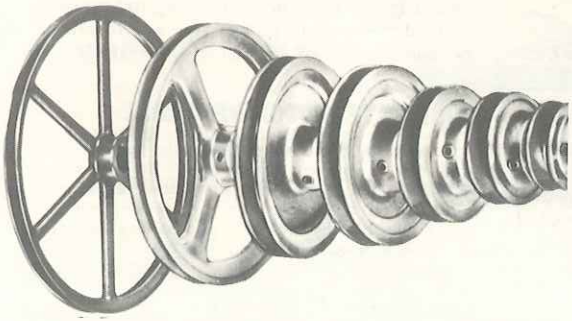
④ High-twist fabric, neoprene impregnated.

THEY PULL TOGETHER OR REPLACE EACH OTHER — PRECISELY

Extra-duty, slip-resistant *Craftsman* V-Belts are so exactly matched for size that a new one will replace an old one without need for readjustment. Then, too, any two or more belts used in a multiple drive will pull equally, each doing its share. One will not carry all the load while the other(s) slip, and wear. To be assured of matched belts use the matching code numbers printed on belts. Any two adjacent numbers (such as 19-20 or 20-21, etc.) constitute matched belts. This perfect matching is another Craftsman-like quality feature.

Craftsman belts are also the finest for wearability . . . they are pre-stretched to fit firmly down in pulley grooves, are water-, heat- and oil-resistant.

PRECISION-MACHINED CRAFTSMAN V-PULLEYS



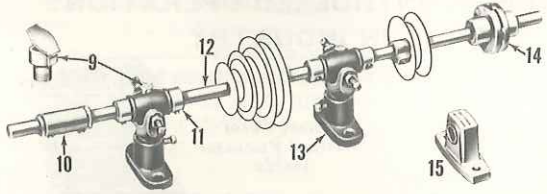
"Easy-Off" TAPERED BUSHING FEATURE

Special, tapered-bushing pulleys (in a variety of types and sizes) will fit their shafts firmly and easily, even though shaft is slightly over- or undersized . . . and can be broken loose quickly by "jack-screw" action of set screws, even from rusted shaft.

All *Craftsman* V-Pulleys are scientifically designed and perfectly balanced, with machined (not simply cast-in) grooves so that belts will grip properly and run truer. This guarantees steady, efficient (no slippage) power transmission, and longer belt life. There are accurately reamed, fixed bore types and the new taper-bushed type (above) . . . all available with or without hubs, with single, double and step-cone grooves and in sizes for every power-tool, machine or line-shaft application.

. . .for Better, Easier Installations

LINE SHAFTS AND ACCESSORIES



9 – Cup Oiler
10 – Rigid Coupling
11 – Collar
12 – Steel Shaft
13 – Shaft Hanger
14 – Flex. Coupling
15 – Pillow Block

Machine Steel Shafting is available in suitable lengths in 1/2-in., 5/8-in. and 3/4-in. diameters for use with 1/2 to 1-1/2 hp motors for driving two or more tools (or machines) with one motor. The Flexible Coupling connects the motor shaft to the line shaft, and is self-aligning to compensate for misalignment of motor mounting. Rigid Couplings are used to add additional lengths of shafting. The adjustable height Hangers are used at intervals to support the shaft — from below, above or the side; or the non-adjustable Pillow Blocks can be used instead. Collars keep the shaft from drifting. Use these accessories to economically power several tools which are not used often enough to require individual motors.

MOTOR RAILS

These rails make it easy to mount your motor. The "floating" type provides suspension motor mounting that automatically keeps correct tension on the belt.

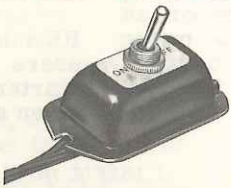
3-WIRE CORD

Heavy-duty, 8-ft. cord fitted with 3-prong "safety" plug. Use with Split-Phase and Capacitor motors up to 3/4 hp.

POWR-PANL

A safe, convenient, 2-plug receptacle with toggle switch — for up to 1 hp total capacity. Fastens to power tool bench.

ON-OFF SWITCH



Handy toggle-type switch fits on motor for easy access and control. For power tool motors up to 3/4 hp.

REVERSING SWITCH

This is a compact switch for instant reversing of any Split-Phase or Capacitor Type motor up to 1 hp. Connection diagram is furnished.

MOTOR ACCESSORIES CONT.

MAGNETIC STARTERS

FOR SAFE, HAZZARD-CONTROLLED OPERATIONS ON THE FARM — IN INDUSTRY

GIVES YOU
OVERLOAD PROTECTION
LOW-VOLTAGE TRIP-OUT
AND REMOTE ON-OFF CONTROL

Manual Reset
Overload Protector
Inside

A TYPICAL MAGNETIC STARTER WITH ON-OFF CONTROL MOUNTED ON THE COVER

AVAILABLE — COMBINED WITH ON-OFF CONTROL — ON ORDER, FOR ANY FARM OR INDUSTRIAL MOTOR

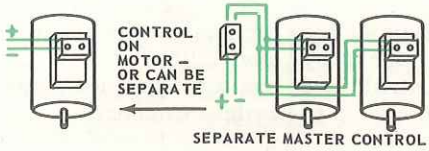
A Magnetic Motor Starter provides *safety* . . . for equipment and individuals. First, it will guard *you* against the hazard of having machinery stop (when power fails), then unexpectedly start up again (when power is restored) to catch you unaware. Second, it will protect *your machinery* against possible damaging effects of such an unexpected stop and restart. Third, it will protect *your motor* — by shutting it off instead of letting it run too hot — should line voltage drop too low, or should something happen to overload or stall the motor when no one is around to notice it. And don't forget that a hot-running or stalled motor — with power still on — can become a fire hazard. With Sears Magnetic Starter in the line, power failure, low voltage or an overload condition shuts the motor off . . . until you restart it by manually operating the overload protector in the starter.

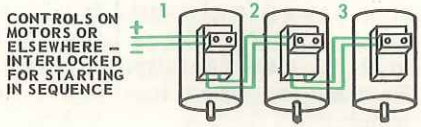
The (included, but separate) On-Off Control also has many advantages.

You can use it on the motor, for on-the-spot control . . . or, if motor is inconveniently situated, can position it elsewhere, at a convenient control location. Having such a separate control for each motor makes it unnecessary to pull a master switch (or disconnect the motor) to shut down just one machine. Moreover, separate Magnetic Starter and On-Off Control units on individual motors can be wired so that manual starting of the motors must be done in a given sequence, when this is desirable.

REA is especially desirous that all users equip motors with magnetic starters . . . for the safety reasons given above.

TYPICAL USEFUL HOOK-UPS



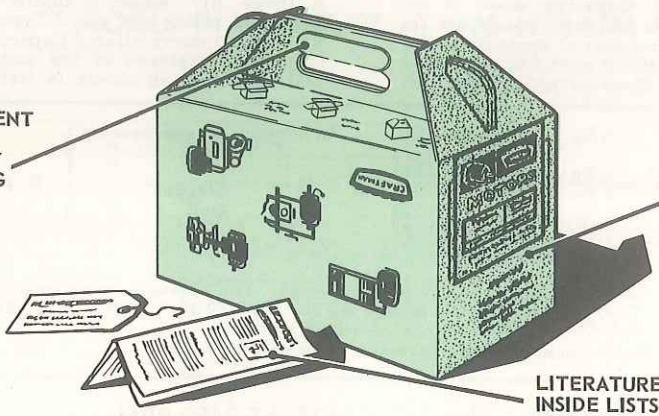


WHY SEARS MOTOR LINE IS COMPLETE FOR OVER 90% OF AVERAGE NEEDS

As told on pages 4-5 there are two major types of current (AC and DC) and many variations of each type . . . each requiring a different motor design. However, over 90% of the homes, offices, farms and small businesses in the U.S. are serviced with just one type of current, *115/230V, single-phase, 60-cycle AC.*

Sears Motor Line includes all the various kinds of motors designed to run on this one type of current and to do all the many different kinds of work that motors do. Included are motors for hard-starting tools and appliances, medium-starting tools and appliances, appliances requiring special motors, for heavy-duty industrial use, and for economical operation of very heavy farm and industrial equipment. Sizes range from 1/4 hp to 1 hp in the popular types . . . and up to 75 hp in the "heavy-work" types.

MOTOR IDENTIFICATION DATA IS AN ADDED SAFEGUARD


CONVENIENT HANDLE FOR EASY CARRYING OF YOUR MOTOR
MOTOR NAMEPLATE DATA LISTED ON THE CARTON END
LITERATURE INSIDE LISTS MOTOR'S USES

Every Sears motor is properly and clearly identified by a nameplate giving the motor model number and all the pertinent electrical data relating to the specific motor. Instructions packaged with each motor further identify it . . . and give all necessary information for wiring to the motor, mounting, maintenance, etc.

In addition, every Sears motor, except only the larger farm and industrial motors, is packaged in its own individual carrying carton, for your convenience, as illustrated here.

Contained in each carton there is a piece of literature on which are listed the various uses for which the motor is recommended. An identification tag attached to the motor lists the features which adapt it for these end uses; and the nameplate data is repeated on the end of the carton. You can't go wrong!

ALWAYS BUY CRAFTSMAN

FOR THE BEST AT A BETTER PRICE

SPECIFIC MOTOR APPLICATIONS

POWER TOOLS

Any power tool will perform better when ample horsepower is applied. *Ample* hp means sufficient starting torque and overload torque, as well as ample running torque. Insufficient hp usually results in rougher, poorer quality work (from slowing of overloaded motor) . . . and probable damage to the motor. Better have an excess of power, especially for those intermittent (but demanding) overload periods (as when a saw blade encounters a tough knot) than to have too little.

Remember that, even though a Split-Phase motor may have sufficient power for normal operations, a Capacitor motor of same size will provide the extra power needed for occasional tough starts or overloads. Also keep in mind that the totally-enclosed Capacitor motor is the most dependable for any application requiring continuous duty or operation under adverse conditions of dust, etc. Because a tool may be operated under many different conditions ranging from occasional, light usage to continuous, heavy usage in severe conditions, our motor recommendations in the following lists also range from the smallest, lightest-duty motor that can be used up to the best. Within this range, select for your own purpose the right motor for the kind of usage you expect to give it.

Following, there are two lists of tools separated according to rpm of motor needed. Each list is preceded by a list of motors arranged by sizes (hp) and giving the Catalog Nos., motor type, type of bearings, and other pertinent data. Also included opposite each motor is the number of the page where this type of motor is illustrated and more fully described. Note that a reference to "Type A (page 8)" means a totally-enclosed Capacitor motor; and that "Type B (page 8)" is an open-ventilated Capacitor motor (with either sleeve or the more rugged ball bearings, as shown in list).

3450 RPM MOTORS	½ hp	Cat. No. 1216	–	Capacitor, Sleeve Bearing	B, page 8
		*Cat. No. 1218	–	" Ball "	
	¾ hp	*Cat. No. 1219	–	" " "	
	1 hp	Cat. No. 1217	–	" Sleeve "	
		*Cat. No. 1220	–	" Ball "	
	1½ hp	*Cat. No. 1221	–	" " "	
	2 hp	♂Cat. No. 12735	–	Type C1 (page 11)	

All above motors have rigid mountings. The sleeve-bearing motors are for 115V; the ball-bearing motors are for 115/230 V . . . all 60 cyc. AC.
**With 4-ft. cord and manual overload protector – no switch.*
♂With manual overload protector – no cord or switch.

TOOLS THAT OPERATE AT 3450 RPM

BENCH SAW	– 8"	½ hp Cap. to ¾ hp Cap.
	– 9" and 10"	¾ hp Cap. to 1 hp Cap.
	– 10" Floor Mod.	1 hp Cap. to 2 hp Cap.
JOINTER-PLANER	– 4" to 6"	See 1725 rpm list
	– 6-1/8"	½ hp Cap. to ¾ hp Cap.
LINE SHAFTS	– (Use "biggest" tool on line)	½ hp Cap. to 2 hp Cap.
POWER SHOP (5-Tool)		¾ hp Cap. to 1 hp Cap.
SANDER	– 4" Belt only	See 1725 rpm list
	– 6" Belt and 9" Disc	½ hp Cap. to ¾ hp Cap.
	– 12" Disc only	See 1725 rpm list
SWING SAW	– 10"	¾ hp Cap. to 1 hp Cap.
THICKNESS PLANER	– 6"	½ hp Cap. to ¾ hp Cap.
	– 12¼" (with or w/o Molder)	1 hp Cap. to 2 hp Cap.
	NOTE: Up to 5 hp needed for heaviest work . . .	See 1725 rpm list
	– 20"	See 1725 rpm list
WOOD SHAPER	– 2½" Max. Spindle Lgth.	½ hp Cap. to 1 hp Cap.

1725 RPM and 1750 RPM MOTORS	¼ hp	†Cat. No. 1210	–	Sp. Phase,	Sleeve	Bearing	(page 9)
	⅓ hp	†Cat. No. 1211	–	"	"	"	" "
		♂Cat. No. 1222	–	Capacitor,	Ball	"	(A, page 8)
	½ hp	†Cat. No. 1212	–	Sp. Phase,	Sleeve	"	(page 9)
		†Cat. No. 1214	–	Capacitor,	"	"	(B, page 8)
		*Cat. No. 1213	–	"	Ball	"	" " "
		♂Cat. No. 1223	–	"	"	"	(A, page 8)
	¾ hp	♂Cat. No. 1224	–	"	"	"	" " "
	1 hp	*Cat. No. 1215	–	"	"	"	(B, page 8)
		♂Cat. No. 1225	–	"	"	"	(A, page 8)
	1½ hp	♂Cat. No. 12715	–	"	"	"	(C1, page 11)
		♂Cat. No. 1233	–	Rep-Ind.,	"	"	(RL, page 11)
	3 hp	♂Cat. No. 12745	–	Capacitor,	"	"	(C1, page 11)
		♂Cat. No. 1240	–	Rep-Ind.,	"	"	(RL, page 11)
	5 hp	♂Cat. No. 1241	–	" "	"	"	" " "
	10 hp	♂Cat. No. 1258	–	Rep-Cap.,	"	"	(RLC, page 11)

Nos. 1210, 1211, 1212 and 1214 have resilient mounting; all others rigid mounting. All sleeve-bearing are for 115 V; all ball-bearing for 115/230 V . . . all 60 cyc. AC.

†With 4-ft. cord – no switch or overload protector.

**With 4-ft. cord and manual overload protector – no switch.*

♂With manual overload protector – no cord or switch.

TOOLS THAT OPERATE AT 1725–1750 RPM

BAND SAW	– 12", 3 Wheel	1/3 hp Sp-Ph to 1/3 hp Cap.
	– 12", 2 Wheel	1/3 hp Sp-Ph to 1/2 hp Cap.
	– 18", 2 Wheel	1 hp Cap. to 1-1/2 hp Cap.
BUFFER	– See Grinder	
DRILL PRESS	– Lt.-Duty up to ½" Chuck	1/3 hp Cap. to 1/2 hp Cap.
	– Hy.-Duty ½" Chuck	1/2 hp Cap. to 3/4 hp Cap.
	– Over ½" Chuck	1 hp Cap. and Up
FLEX. SHAFTS	– 50 or 72" With Multi-Speed Devise	1/3 hp Sp-Ph Rigid Base
	– Without Multi-Speed Devise	1/4 hp Sp-Ph to 1/2 hp Cap.
GEM MAKER	– 6" or 10"	1/3 hp Sp-Ph to 1/3 hp Cap.
GRINDER-BUFFER	– 6" Wheel(s)	1/4 hp Sp-Ph to 1/3 hp Cap.
	– 8" Wheel(s)	1/3 hp Sp-Ph to 1/2 hp Cap.
GRINDSTONE (WET)	– 10" Wheel	1/4 hp Sp-Ph to 1/3 hp Cap.
HACKSAW	– 3x6" Cap. Continuous Blade	1/4 hp Sp-Ph to 1/3 hp Cap.
	– 12" Reciprocal Blade	1/3 hp Sp-Ph to 1/3 hp Cap.
JIG SAW	– 18"	1/3 hp Sp-Ph to 1/2 hp Cap.
JOINTER-PLANER	– 4-1/8"	1/3 hp Sp-Ph to 1/3 hp Cap.
	– 4-3/8"	1/3 hp Sp-Ph to 1/3 hp Cap.
	– 6-1/8"	See 3450 rpm list
METAL LATHE	– 6" Swing	1/4 Sp-Ph to 1/3 hp Cap.
	– 12" Swing	1/3 hp Cap. to 1/2 hp Cap.
POLISHING HEAD	– Up to 8" Wheel(s)	1/4 hp Sp-Ph to 1/3 hp Cap.
SANDER	– 4" Belt only	1/3 hp Sp-Ph to 1/3 hp Cap.
	– 6" Belt and 9" Disc	See 3450 rpm list
	– 12" Disc only	1/3 hp Sp-Ph to 1/3 hp Cap.
THICKNESS PLANER	– 6" and 12¼"	See 3450 rpm list
	NOTE: For over 2 hp and up to 5 hp with 12¼" model, use a 1725 rpm motor.	
	– 20"	3 hp Cap. to 10 hp Rep-Cap.
WOOD LATHE	– 8" Swing	1/3 hp Sp-Ph to 1/2 hp Cap.
	– 12" Swing	1/3 hp Sp-Ph to 1/2 hp Cap.

Motor selection is explained for each type of equipment. Wherever there is a choice among two or more motors of the same hp, our recommendations are listed in the order of quality – with the *best* motor last. In such case, a "better" motor may be one having a greater starting and/or overload capacity (usually, with lower starting amps. requirement) . . . or may be a 3-phase motor for use where power supply will accomodate this even greater capacity and more economical-running type. Wherever there is a choice between an open-ventilated motor and a totally-enclosed, fan-cooled type, the latter type is also shown last (as being a "better" selection for use under adverse weather conditions).

SP – Split-Phase Motor (p. 9)
*CAP-A – Encl'd Cap. Motor (p. 8)
CAP-B – Open Cap. Motor (p. 8)
*CI – Capacitor Motor (p. 11)
*RL – Rep-Ind. Motor (p. 11)
*RM – Rep-Ind. Motor (p. 11)
RCL – Rep-Cap. Motor (p. 11)
*3-Ph. – Squirrel-Cage Ind. Motor (p. 11)

*Totally-Enclosed, Fan-Cooled Types

NOTE: In addition to the above Catalog Listed motors Sears also carries Explosion-Proof (XP) Motors and Totally-Enclosed Non-Ventilated (TENV) Motors. These are available from 1/3 to 15 hp and can be ordered specially instead of one of the recommended motors, if your application requires. Refer to Sears Personal Service Department for prices and other information . . . or for assistance in making your selection.

If in doubt, select the *best* or a greater hp motor rather than underpower your application!

AIR COMPRESSORS

Horsepower is determined according to operating pressure (LBS. PRESS.) and cu. ft. of free air displaced per min. (CFM).

SINGLE-STAGE TYPES

CFM	LBS. PRESS.	HP	MOTOR CAT. NO.
3.4	80	1/2	1213 (CAP-B), 1223 (CAP-A) or 1230 (RM)
4.6	"	3/4	1224 (CAP-A) or 1231 (RM)
7.2	"	1	1215 (CAP-B), 1225 (CAP-A), 12705 (C1) or 1232 (RL)
9.5	"	1-1/2	12715 (C1) or 1233 (RL)
13.0	"	2	12725 (C1) or 1234 (RL)
21.0	"	3	12745 (C1), 1240 (RL) or 1292 (3-Ph.)
33.0	"	5	1241 (RL) or 1280 (3-Ph.)
0.9	100	1/3	1222 (CAP-A)
1.5 to 1.9	"	1/2	1213 (CAP-B), 1223 (CAP-A) or 1230 (RM)
3.0 to 3.3	"	3/4	1224 (CAP-A) or 1231 (RM)
3.4 to 4.1	"	1	1215 (CAP-B), 1225 (CAP-A), 12705 (C1) or 1232 (RL)
6.0	"	1-1/2	12715 (C1) or 1233 (RL)
8.0	"	2	12725 (C1) or 1234 (RL)
11.0 to 12.0	"	3	12745 (C1), 1240 (RL) or 1292 (3-Ph.)
19.0	"	5	1241 (RL) or 1280 (3-Ph.)
30.0	"	7-1/2	1242 (RL) or 1281 (3-Ph.)
0.8	150	1/3	1222 (CAP-A)
1.2 to 1.5	"	1/2	1213 (CAP-B), 1908 (CAP-A) or 1230 (RM)
2.3 to 2.7	"	3/4	1224 (CAP-A) or 1231 (RM)
2.7 to 3.0	"	1	1215 (CAP-B), 1225 (CAP-A), 12705 (C1) or 1232 (RL)
4.0 to 5.1	"	1-1/2	12715 (C1) or 1233 (RL)
6.6 to 8.8	"	2	12725 (C1) or 1234 (RL)
9.1 to 12.5	"	3	12745 (C1), 1240 (RL) or 1292 (3-Ph.)
16.0 to 25.0	"	5	1241 (RL) or 1280 (3-Ph.)
30.0	"	7-1/2	1242 (RL) or 1281 (3-Ph.)

TWO-STAGE TYPES

CFM	LBS. PRESS.	HP	MOTOR CAT. NO.
3.8 to 4.1	150 to 175	1-1/2	12715 (C1) or 1233 (RL)
5.6 to 5.9		2	12725 (C1) or 1234 (RL)
7.4 to 8.0		3	12745 (C1l, 1240 (RL) or 1292 (3-Ph.)
11.6 to 12.0		5	1241 (RL) or 1280 (3-Ph.)
17.2 to 19.0		7-1/2	1242 (RL) or 1281 (3-Ph.)

BARN CLEANERS

Horsepower depends upon the feet of loaded chain in use.

LOADED CHAIN	HP	MOTOR CAT. NO.
Up to 120 ft.	1-1/2	1233 (RL)
120 to 160 ft.	2	1234 (RL)
165 to 225 ft.	3	1240 (RL) 1292 (3-Ph)
230 ft. and Up	5	1241 (RL) or 1280 (3-Ph.)

BUNK FEEDERS

Horsepower depends upon the feet of loaded conveyor in use.

LOADED CONVEYOR		HP	MOTOR CAT. NO.
Open Type 9" Auger	Tube Type *7" Auger		
–	Up to 50 ft.	1	12705 (CI) or 1232 (RL)
Up to 50 ft.	60 to 70 ft.	1-1/2	12715 (CI) or 1233 (RL)
60 to 80 ft.	80 to 90 ft.	2	12725 (CI) or 1234 (RL)
90 to 120 ft.	100 to 120 ft.	3	12745 (CI), 1240 (RL) or 1292 (3-Ph)
130 to 160 ft.	130 to 160 ft.	5	1241 (RL) or 1280 (3-Ph.)

*If 8" Auger, increase hp to next larger size.

CONCRETE MIXERS

Horsepower is determined by the cu. ft. of concrete delivered per batch. NOTE: Sears Wheelbarrow Model is not included here as this requires a special motor to fit in area provided.

CU. FT. CAPACITY	HP	MOTOR CAT. NO.
Up to 1-1/2	1/4	1210 (SP)
1/2 to 3	1/3	1211 (SP)
3 to 5	1/2	1212 (SP) or 1214 (CAP-B)

CROP DRYERS

Horsepower is rated in accordance with the air delivery in cu. ft. per min. (CFM) at end of duct, and by the temperature rise (TR). NOTE: Typical installations are given below, and are based upon a 10 ft. duct and the burning of 6 gal. of fuel oil per hour.

CFM	TR	HP	MOTOR CAT. NO.
10,250	40°	3	1240 (RL) or 1292 (3-Ph.)
8,200	48°		
5,900	65°		
3,300	102°		
12,200	38°	5	1241 (RL) or 1280 (3-Ph.)
11,600	39°		
10,300	41°		
8,700	46°		
14,900	34°	7-1/2	1242 (RL) or 1281 (3-Ph.)
14,300	35°		
12,900	37°		
11,500	39°		
17,300	30°	10	1258 (RCL)
16,600	31°		
15,000	34°		
13,200	36°		

FEED MIXERS

Horsepower is determined by the bushel capacity of the mixer.

CAP. IN BU.	HOPPER ABOVE FLOOR		HOPPER BELOW FLOOR	
	HP	MOTOR CAT. NO.	HP	MOTOR CAT. NO.
20	3/4	1231 (RM)	1	1232 (RL)
25	1-1/2	1233 (RL)	2	1234 (RL)
40	2	1234 (RL)	3	1240 (RL) or 1292 (3-Ph)
80	3	1240 (RL)	5	1241 (RL) or 1280 (3-Ph)
120	5	1241 (RL) or 12935 (3-Ph.)	7-1/2	1242 (RL) or 1281 (3-Ph)

GRAIN AUGERS

Horsepower depends upon the length and diameter of the auger tube.

TUBE LGTH.	TUBE DIA.	HP	MOTOR CAT. NO.
11 ft.	4 to 5 in.	1/2	1223 (CAP-A) or 1230 (RM)
"	6 in.	3/4	1224 (CAP-A) or 1231 (RM)
16 ft.	4 in.	1/2	1223 (CAP-A) or 1230 (RM)
"	5 in.	3/4	1224 (CAP-A) or 1231 (RM)
"	6 in.	1	1225 (CAP-A), 12705 (C1) or 1232 (RL)
21 ft.	4 in.	1/2	1223 (CAP-A) or 1230 (RM)
"	5 in.	1	1225 (CAP-A), 12705 (C1) or 1232 (RL)
"	6 in.	2	12725 (C1) or 1234 (RL)
"	8 in.	3	12745 (C1), 1240 (RL) or 1292 (3-Ph.)
27 ft.	4 in.	1/2	1223 (CAP-A) or 1230 (RM)
"	5 in.	1-1/2	12715 (C1) or 1233 (RL)
"	6 in.	3	12745 (C1), 1240 (RL) or 1292 (3-Ph.)
"	8 in.	5	1241 (RL) or 1280 (3-Ph.)
31 ft.	4 in.	3/4	1224 (CAP-A) or 1231 (RM)
"	5 in.	2	12725 (C1) or 1234 (RL)
"	6 to 8 in.	5	1241 (RL) or 1280 (3-Ph.)
33 ft.	5 in.	2	12725 (C1) or 1234 (RL)
"	6 to 8 in.	5	1241 (RL) or 1280 (3-Ph.)
41 ft.	5 in.	2	12725 (C1) or 1234 (RL)
"	6 in.	5	1241 (RL) or 1280 (3-Ph.)
"	8 in.	7-1/2	1242 (RL) or 1281 (3-Ph.)
51 ft.	8 in.	7-1/2	1242 (RL) or 1281 (3-Ph.)

PAINT SPRAYERS

(Also see Air Compressors)

For this equipment use the same or next higher horsepower motor as original, or as recommended by manufacturer.

HP	MOTOR CAT. NO.
1/3	1222 (CAP-A)
1/2	1213 (CAP-B) or 1223 (CAP-A)
3/4	1224 (CAP-A)
1	1215 (CAP-B), 1225 (CAP-A) or 12705 (C1)
1-1/2	12715 (C1) or 1233 (RL)

PUMPS, WATER – V-BELT DRIVEN

Each model pump is designed to be driven at a certain rpm by a recommended hp motor . . . or at several different rpms with a motor of recommended hp for each speed. When driven as specified, a pump will produce tabulated results. In the case of Centrifugal Pumps, these results are tabulated in terms of gals. per min (GPM) under certain head pressures (FT. of HEAD). For Shallow Well Piston Pumps the results are stated simply in gals. per hr. (GPH). Use the same hp motor (and pulley sizes) as the original, or as recommended by manufacturer.

HP	MOTOR CAT. NO.
1/4	1210 (SP)
1/3	1211 (SP) or 1222 (CAP-A)
1/2	1212 (SP), 1214 (CAP-B) or 1223 (CAP-A)
3/4	1224 (CAP-A) or 1231 (RM)
1	1220 (CAP-B), 1225 (CAP-A) or 12705 (C1)

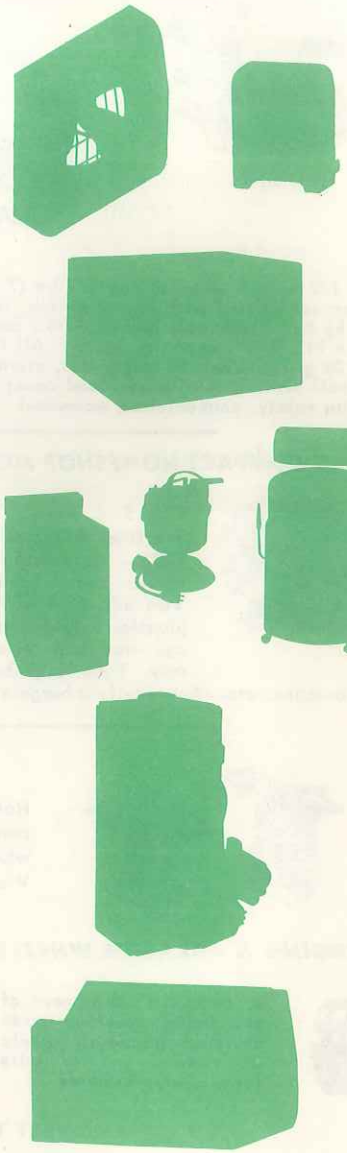
SILO UNLOADERS

Horsepower is determined by the type of silage and diameter of silo in feet.

Thrower Operation SILAGE	SILO DIA., FT.	HP	MOTOR CAT. NO.
Grass, Corn, Haylage	10 - 14	1/2	1223 (CAP-A)
Grass, Corn	16 - 18	3/4	1224 (CAP-A)
Grass, Corn	20 Up	1	1225 (CAP-A) or 12705 (C1)
Haylage	17 Up	1	1225 (CAP-A) or 12705 (C1)
Auger Operation SILAGE	SILO DIA., FT.	HP	MOTOR CAT. NO.
Grass, Corn, Haylage	10 - 14	3	12745 (CI), 1240 (RL), 1292 (3-Ph)
Grass, Corn	16 - 18	5	1241 (RL) or 1280 (3-Ph)
Grass, Corn	20 Up	7-1/2	1242 (RL) or 1281 (3-Ph)
Haylage	17 Up	7-1/2	1242 (RL) or 1281 (3-Ph)

HOME EQUIPMENT

Specific replacement motors are recommended. Check the selling price on a new motor before having your defective motor repaired. The new motor may cost you no more . . . and will provide better performance.



⊥ AIR CIRCULATORS

Up to 18" Blade	*Cat. No.	19835
20 to 30" "	* " "	1983

⊥ AIR CONDITIONERS – CENTRAL INSTALLATIONS

Single-Speed, 48 Frame	*Cat. No.	19835
" " , 56 "	* " "	1983
Two-Speed, " "	* " "	1971
3 Ton	ø Cat. No.	1240
5 "	ø " "	1241
7½"	ø " "	1242

DRYERS (LAUNDRY), AUTOMATIC

All Models (Gas & Elec.)	*Cat. No.	1963
	* " "	1969

⊥ FAN, ATTIC

Up to 18" Blade	*Cat. No.	19835
20 to 30" "	* " "	1983
Two-Speed	* " "	1971

⊥ FURNACES, FORCED WARM AIR – BLOWERS, 8 to 10" WHEEL

Single-Speed, 48 Frame	*Cat. No.	19835
" " , 56 "	* " "	1983
Two-Speed, " "	* " "	1971

OIL BURNERS

All Home Models	ø Cat. No.	1984

SPRAYERS, INSECTICIDE

1½ GPM	ø Cat. No.	1215

WASHERS (LAUNDRY), AUTOMATIC

Single-Speed	*Cat. No.	1985
Two-Speed	* " "	1986

WRINGER-WASHERS

All Models	Cat. No.	1989

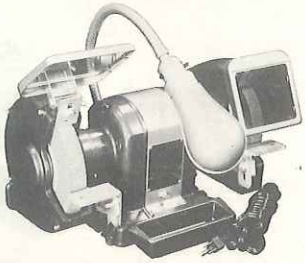
⊥Motors are designed for low in-rush current . . . to minimize light flicker on starting.
**Motors equipped with automatic-reset overload protectors.*
øMotors equipped with manual-reset overload protectors.

There's a Craftsman Grinder

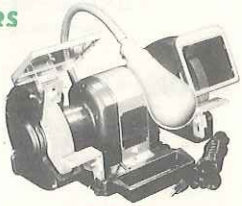
FOR EVERY PURPOSE

SELF-POWERED, 2-WHEEL GRINDERS

1/4 HP



1/2 HP



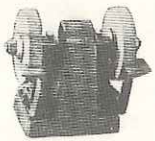
1/3 HP

The 1/3 hp (6" wheels) and 1/2 hp (7" wheels) models are for heavy-duty, industrial use – are each fitted with on-off switch, integral tool light, and removable quench tray. The 1/3 hp has 115V. split-phase motor; and so does the 1/4 hp homeshop model. The 1/2 hp has a 115/230V. capacitor motor. All three models operate at 3450 rpm . . . are fitted with one 36 grit and one 60 grit wheel, sturdy wheel guards, eye shields and tool rests . . . and are ball-bearing, totally-enclosed construction. One of these models will answer your needs – with safety, convenience, economy!

COMPACT HOMESHOP MODEL

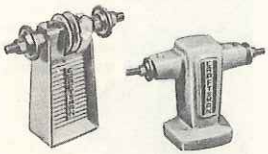
Two 5-in. wheels (one coarse, one fine) driven at 3600 rpm by 120V. universal motor with toggle switch and 8-ft. cord. Two adj. tool rests, two clear plastic shields, built-in storage tray and removable water tray. Take ½x20 thread wheels, wire brushes, etc. An excellent bargain!

BELT-DRIVEN TYPES



Choice of 6- or 8-in. wheel sizes for use with 1/3 HP, 1725 rpm motors. Adjustable tool rests and removable wheel guards. Ball-bearing construction for long life.

POLISHING HEADS



Not for grinding, but excellent for polishing, paint or rust removal. Take ½x20 thread wire wheel brushes, etc. For bench mounting and V-belt drive from separate motor.

GRINDING & ABRASIVE WHEELS

A complete assortment of top-quality, aluminum-oxide grinding and cut-off wheels in various popular grits for all Sears grinders.

NEW "SAFEST" GRINDING WHEEL

Slip-on grinding bands fit on hard-rubber, steel-core wheel . . . are held tight by the centrifugal expansion of the unbreakable wheel.

A MIDWEST TECHNICAL PUBLICATION
Prepared For

SEARS, ROEBUCK AND CO.
In Canada, Simpsons-Sears, Ltd.